

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (date/month/year)	19 January 2005 (19-01-2005)
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Applicant's or agent's file reference
349-040-P

FOR FURTHER ACTION
See paragraph 2 below

International application n^o
PCT/CA2004/001500

International filing date (date/month/year))
17 August 2004 (17-08-2004)

Priority date (date/month/year)
19 August 2003 (19-08-2003)

International Patent Classification (IPC) or both national classification and IPC

B05D-5/00, B05D-3/06, B05C-11/08, B05C-5/00, C04B-35/10, C23D-3/00, C23C-26/00

Applicant **THE UNIVERSITY OF WESTERN ONTARIO**

1. This opinion contains indications relating to the following items :

- | | | |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the opinion |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input checked="" type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/
Commissioner of Patents
Canadian Patent Office
Box PCT, Ottawa/Gatineau K1A 0C9

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INTERNATIONAL SEARCHING AUTHORITY**

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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language which it was filed, unless otherwise indicated under this item.

- ☐ This opinion has been established on the basis of a translation from the original language into the following language __, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of :

a. type of material

- ☐ a sequence listing
☐ table(s) related to the sequence listing

b. format of material

- ☐ in written format
☐ in computer readable form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments :

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Box No. V reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2-7, 11, 16-33, 35-36, 39, 41-43, 45-50, 52-54, and 56	YES
	Claims	1, 8-10, 12-15, 34, 37-38, 40, 44, 51, 55, and 57-58	NO
Inventive step (IS)	Claims	3, 14, 17-33, 36, 43, and 53	YES
	Claims	1-2, 4-13, 15-16, 34-35, 37-42, 44-52, and 54-58	NO
Industrial applicability (IA)	Claims	1-58	YES
	Claims		NO

2. Citations and explanations :

D1: Hahner: "Organic Films (Langmuir-Blodgett Films and Self-Assembled Monolayers)" Encyclopaedia of Chemical Physics and Physical Chemistry, vol. 1-3, 2001, pages 15-37

D2: Liakos et al.: "Self-assembly of mono-functional aliphatic molecules on magnetron sputtered aluminium", July 2003,
http://www2.umist.ac.uk/corrosion/Alexander_Presentations/

D3: CA 2,453,537

D1 teaches the formation of a self-assembled monolayer comprising: exposing an hydrophilic support surface to a dilute solution comprising an hydrophobic organic solvent and hydrophilic surface active solute for an effective time, a specific example of which approximating 24 hours, such that an hydrophilic surface monolayer is present. A plethora of different systems are presented, one of which consists of a carboxylic acid surface activator dissolved in a high-purity alkane solution adsorbed onto an aluminum oxide surface. Further examples of supports such as metals, glasses and ceramics are also disclosed. Phosphonic acids utilized as activating molecules and chloro- based hydrophobic solvents are also imparted. The use in lithography for pattern printing and metal coatings are further disclosed.

D2 teaches production of a self-assembled monolayer comprising: pre-treating a magnetron sputtered aluminium support in an evacuated chamber; preparing an assembling solution comprising an effective hydrophobic solvent, specifically toluene, and a surface active promoter, specifically, octadecylphosphonic acid; and immersing said hydrophilic sputtered aluminum support in the assembling solution for an effective time to establish a self-assembled layer.

D3 teaches a method for forming a self-assembling monolayer on a surface comprising: exposing a composition comprising amphiphilic molecules provided in a carrier solvent. Said composition, in turn, is brought into contact surface proximity to a suitable surface to permit molecules to spontaneously orient into a monolayer. It is demonstrated that the carrier solvent, and support have different affinities toward water. Suitable supports include: metals, minerals and ceramics. The amphiphilic molecules comprise of a hydrophobic domain which spontaneously associates with the surface from a polar solvent, and of a hydrophilic domain which allows the molecules to be dispersed in the polar solvent.

A. Novelty

Insofar as the present text can be understood, the present application does not meet the requirements of Article 33(2) PCT, because the subject matter of claims 1, 8-10, 12-15, 34, 37-38, 40, 44, 51, 55, and 57-58 are anticipated by D1 (1, 8-10, 12-15, 34, 37-38, 40, 44, 51, 55, and 57-58) or D2 (1, 8, 9, 12, 15, 34, 37, 38, and 44).

B. Inventive step

Claims 1-2, 4-13, 15-16, 34-35, 37-42, 44-52, and 54-58 lack inventive step, hence do not comply with Article 33(3) PCT in view of the teachings of D1 (1-2, 4-13, 15-16, 34-35, 37-42, 44-52, and 54-58) or D3 (1, 34, and 51) and in light of the state of the art. Exposure methods encompassing spin-coating and aerosol dispersion in the context of the alleged invention are known in the art.

C. Industrial applicability

Claims 1-58 have industrial applicability as defined under Article 33(4) PCT.

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Box No. VII Certain defects in the international application

A. Description defects

Non-published document reference – H.Y. Nie et al. (34) – of the description does not comply with Article 5 PCT and PCT Guideline 4.27.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made :

Present claims 1, 17, 34, and 51 relate to a method defined by reference to a desired characteristic or property: namely, the production of a monolayer on a substrate having a hydrophobic surface, comprising the steps of a) pre-treating a surface of a substrate having a hydrophilic surface to remove impurities therefrom; and b) exposing the hydrophilic surface to a fluid comprising a mixture of molecules which can self-assemble on the hydrophilic surface and hydrophobic molecules for a sufficient time so that the molecules which can self-assemble on the hydrophilic surface form a complete self-assembled monolayer.

The instant broad claims 1, 17, 34, and 51 cover all methods having these characteristics or properties, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such methods. Hence, the claims lack support, and the application lacks disclosure. Further, independent of the above reasoning claims 1, 17, 34, and 51 also lack clarity (Article 6 PCT), as an attempt is made to define the method by reference to a result to be achieved.

Claims 6, 7, 10, 14, 16, 25, 26, 39, and 40 do not comply with Article 6 PCT. The inclusion of "the hydrophobic" in said claims lacks antecedence and as a result induces a lack of clarity.

Claim 18 does not comply with Article 6 PCT. The inclusion of "the liquid dispersion" in said claim lacks antecedence and as a result induces a lack of clarity.

Claims 22 and 36 do not comply with Article 6 PCT. The inclusion of "about" in combination with said disclosed ranges causes a lack of clarity.

The grouping of claims 45-50 is not presented in a practical manner, hence do not comply with Rule 6.4(c) PCT.

Claims 10, 26 and 40 do not comply with Article 6 PCT. The inclusion of "including" causes a lack of clarity.

Claims 10, 26 and 40 do not comply with Rule 6.4(b) PCT, as said claims impart improper dependence on predecessor claims 6 (claim 10), 7 (claim 10), 25 (claim 26), and 39 (claim 40).

Claims 3, 16, 17, 21, and 53 do not comply with Article 6 PCT. Replacement with the following may overcome clarity concerns:

- claim 3 should include "and";
- claim 16 should include a period;
- claim 17 should include "a)";
- claim 21 should include by "dipping"; and
- claim 53 should include "and".